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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,351	01/03/2005	Henry Daniell	1358-PCT-US-01	2622

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SALIWANCHIK LLOYD & SALIWANCHIK
A PROFESSIONAL ASSOCIATION
PO BOX 142950
GAINESVILLE, FL 32614-2950

EXAMINER	
KUBELIK, ANNE R	
ART UNIT	PAPER NUMBER
1638	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,351	DANIELL, HENRY	
	Examiner	Art Unit	
	Anne R. Kubelik	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *31-33 and 36-40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13, 15-20, 22-30,34,35 and 41-44* is/are rejected.

7)☐ Claim(s) *14 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 June 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election with traverse of Group I in the reply filed on 7 June 2006 is acknowledged. The traversal is on the ground(s) that the aprotinin of WO 00/03012 is not a protective antigen as defined in ¶39. This is not found persuasive because aprotinin would elicit an immunogenic response in mammals when appropriately administered, for example in a distantly related animal; thus, it fits the specification's definition of a protective antigen.

The requirement is still deemed proper and is therefore made FINAL.

Claims 31-33 and 36-40 are withdrawn from consideration as being drawn to nonelected inventions.

2. The drawings are objected to for the following reasons:

Figs 1A-C, 2A-C, 6A, 7, 13A, 16, 17, 18, 21, 22 and 24 are objected to because the lettering cannot be made out.

Fig 9, 11, 19, 20A, 21, and 23A-D are objected to because no details can be made out in the photographs.

Fig 11 and 24 are objected to because the information in the legend should be in the Brief Description.

Claim Objections

3. Claims 2, 5-6, 8-10, 20, 34-35 and 42 are objected to because of the following informalities:

In claims 2, 5-6, 8-10, 20, 35 and 42, there should be a comma before "wherein" in line 1.

In claim 5, the comma after "wherein" should be deleted.

In claim 34, line 1, --, said method-- should be inserted before "comprising".

4. Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. There is no structural feature recited in the claim that makes it targeted to chloroplasts, amyloplasts, propastides, leucoplasts or etioplasts rather than any type of plastids. Thus, the claim fails to further limit claim 1.

5. Claim 35 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claim recites that the protective antigen produces an immunogenic response in a mammal. However, for an antigen to be protective, it must produce an immunogenic response in a mammal. Thus, claim 35 fails to further limit claim 34.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-2, 26 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the

relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 28 is drawn to a plastid transformation vector comprising plastid 5' and 3' elements from Cry2Aa2 UTR. Cry2Aa2 is from bacteria, which do not have plastids, and the specification does not describe any plastid 5' and 3' elements from Cry2Aa2 UTR.

Thus, one of skill in the art would not recognize that Applicant was in possession of the necessary common attributes or features of the genus in view of the disclosed species.

Therefore, given the lack of written description in the specification with regard to the structural and functional characteristics of the claimed compositions, it is not clear that Applicant was in possession of the claimed genus at the time this application was filed.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 9, 28 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Dependent claims are included in all rejections.

Claim 9 is indefinite in its recitation of the abbreviation "BADH." For purposes of examination, it was assumed that "BADH" referred to "betaine aldehyde dehydrogenase." Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claims 28 and 30 are indefinite in their recitation of the abbreviation "UTR." For purposes of examination, it was assumed that "UTR" referred to "untranslated region." Such treatment does not relieve Applicant of the responsibility to respond to this rejection.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

11. Claims 1-5, 7, 10-11, 15-20, 22, 24-26, 34-35 and 41-44 are rejected under 35 U.S.C. 102(a) as being anticipated by Daniell et al (August, 2001, J. Mol. Biol. 311:1001-1009).

Daniell et al teach plastid transformation vectors comprising as operably linked components, a region of plastid homology, the Prrn (16S sRNA) plastid promoter, a DNA encoding the antibiotic selectable marker aadA, a DNA sequence encoding the protective bacterial antigen cholera toxin, each with their own ribosome binding sites, the psbA 3' untranslated region and a second region of plastid homology and plants, seeds and progeny thereby transformed (Figures 1A and 3; the paragraph spanning pg 1002-1003; pg 1004, left column, paragraph 2). The ribosome binding sites would be 5' untranslated regions, as they are transcribed but do not encode protein. The flanking regions are part of an inverted repeat in the plastid genome (paragraph spanning pg 1002-1003); thus, the DNA encoding the cholera toxin is located within the inverted repeat region. The cholera toxin produced would be competent to produce an immunogenic response in a mammal (paragraph spanning the columns on pg 1006). Daniell et al also suggest adding a DNA sequence encoding a chaperonin to the vectors (paragraph spanning pg 1005-1006) or using the BADH gene as a selectable marker (pg 1006, right column)

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a), which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claim 1-3, 7-8, 10-13, 15-20, 22-26, 34-35 and 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell (WO 99/10513).

The claims are drawn to plastid transformation vectors comprising a first flanking sequence, a DNA sequence encoding a bacterial antigen, and a second flanking sequence.

Daniell teaches plastid transformation vectors comprising as operably linked components, a region of plastid homology acting as a first flanking sequence, the Prrn plastid promoter, a DNA encoding the selectable marker aadA, the EPSPS selectable marker gene, the psbA 3' untranslated region and a second region of plastid homology acting as a second flanking sequence (examples 1-2; Fig 2). Daniell also teaches plants and seeds thereby transformed (examples 2-9). The regions of homology of one of the vectors are transcriptionally active spacer regions conserved in different plant species (pg 20-22; Fig 2B, 3A) or are part of the inverted repeat of tobacco chloroplast genome (Fig 2A, 3B). Daniels et al also teaches the use of the vectors to produce nonplant proteins in plant chloroplasts (example 10), including isolation of the protein from the transformed plant (pg 55, lines 9-34). Daniell also teach use of antibiotic-free selectable markers, including herbicides, in the vector (pg 11, lines 4-6; pg 22, lines 27-34; pg 24, lines 9-11; claims 140-147 and 150-153). Daniell also suggests adding to the vectors a DNA sequence encoding a protective antigen like bacterial proteins used in vaccines (pg 31,

lines 9-28). Daniell does not disclose plastid transformation vectors encoding a bacterial antigen.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors taught by Daniell, to encode a bacterial antigen. One of ordinary skill in the art would have been motivated to do so because of the suggestion of Daniell to do so (pg 31, lines 9-28).

14. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell (WO 99/10513) as applied to claims 1-3, 7-8, 10-13, 15-20, 22-26, 34-35 and 41-44 above, and further in view of McBride et al (1996, US Patent 5,576,198).

The claims are drawn to plastid transformation vectors comprising as operably linked components, a T7 promoter, a DNA sequence encoding a protective antigen and a second region of plastid homology and plants and seeds thereby transformed.

The teachings of each of Daniell (1999) are discussed above. Daniel et al does not teach using a T7 gene 10 promoter.

McBride et al teach using T7 gene10 promoter in plastid transformation constructs (column 14, line 8, to column 16, line 43 and column 18, line 54, to column 21, line 22).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of expressing bacterial antigens in plastids as taught by Daniell 1999, to use the T7 gene10 promoter as described in McBride et al. One of ordinary skill in the art would have been motivated to do so because of the regulatory control conferred by this method (McBride et al, column 2, lines 44-55). Furthermore, the T7 promoter would comprise an element of the Cry2Aa2 UTR of at least one base.

15. Claims 1-5, 7-11, 15-20, 22, 24-26, 34-35 and 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell et al (August, 2001, J. Mol. Biol. 311:1001-1009).

The claims are drawn to plastid transformation vectors comprising a first flanking sequence, a DNA sequence encoding a bacterial antigen, and a second flanking sequence, further comprising BADH as a selectable marker.

The teachings of each of Daniell et al are discussed above. Daniell et al do not teach using BADH as a selectable marker.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors as taught by Daniell et al to use BADH as a selectable marker. One of ordinary skill in the art would have been motivated to do so because of the suggestion of Daniell et al to do so (pg 1006, right column, paragraph 1).

16. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell et al (August, 2001, J. Mol. Biol. 311:1001-1009) as applied to claims 1-5, 7-11, 15-20, 22, 24-26, 29-30, 34-35 and 41-44 above, and further in view of McBride et al (1996, US Patent 5,576,198).

The claims are drawn to plastid transformation vectors comprising as operably linked components, a T7 promoter, a DNA sequence encoding a protective antigen and a second region of plastid homology and plants and seeds thereby transformed.

The claims are drawn to plastid transformation vectors comprising as operably linked components, a T7 promoter, a DNA sequence encoding a protective antigen and a second region of plastid homology and plants and seeds thereby transformed.

The teachings of each of Daniell et al are discussed above. Daniell et al do not teach using a T7 gene 10 promoter in the vectors.

McBride et al teach using T7 gene10 promoter in plastid transformation constructs (column 14, line 8, to column 16, line 43 and column 18, line 54, to column 21, line 22).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of expressing bacterial antigens in plastids as taught by Daniell et al, to use the T7 gene10 promoter as described in McBride et al. One of ordinary skill in the art would have been motivated to do so because of the regulatory control conferred by this method (McBride et al, column 2, lines 44-55). Furthermore, the T7 promoter would comprise an element of the Cry2Aa2 UTR of at least one base.

17. Claims 4-5 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell (WO 99/10513) as applied to claims 1-3, 7-8, 10-13, 15-20, 22-26, 34-35 and 41-44 above, and further in view of Maliga et al (1999, US Patent 5,877,402).

The claims are drawn to plastid transformation vectors comprising a first flanking sequence, a plastid promoter, a 5' UTR, a DNA sequence encoding a bacterial antigen, a 3' UTR, and a second flanking sequence. Claim 27 includes a recitation where the 5' and 3' elements are from psbA.

The teachings of each of Daniell et al are discussed above. Daniell et al do not disclose having three regulatory sequences, including those of psbA.

Maliga et al teach constructs comprising a variety of plastid promoters and 5' and 3' UTRs, including those form psbA (Fig 22C).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the plastid transformation vectors taught by Daniell et al to use the regualtory elemenst described in Maliga et al. One of ordinary skill in the art would have been motivated to do so

because choosing regulatory elements in the vector is clearly a result effective parameter that a person of ordinary skill in the art would routine optimize. Optimization of parameters is a routine practice that would be obvious for one of ordinary skill in the art to employ to best achieve the desired results. Thus, absent some demonstration of unexpected results from the claimed parameters, the use of the regulatory elements taught by Maliga et al would have been obvious at the time of Applicant's invention.

18. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daniell (WO 99/10513) as applied to claims 1-3, 7-8, 10-13, 15-20, 22-26, 34-35 and 41-44 above, and further in view of Lam et al (1996, US Patent 5,484,719).

The claim is drawn to are drawn to plastid transformation vectors comprising as operably linked components, a promoter, a DNA sequence encoding the protective antigen anthrax toxin and a second region of plastid homology and plants and seeds thereby transformed.

The teachings of each of Daniell et al are discussed above. Daniell et al do not teach using a DNA sequence encoding the protective antigen anthrax toxin.

Lam et al teach expressing anthrax toxin in plants (column 5, lines 44-63).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the method of expressing bacterial antigens in plastids as taught by Daniell to express anthrax toxin as described in Lam et al. One of ordinary skill in the art would have been motivated to do so because substitution of one protective antigen for another is an obvious design choice, and because anthrax vaccine is an economically important one.

19. Claims 14 and 21 are free of the prior art, given the failure of the prior art to teach or

suggest plastid transformation vectors comprising a first flanking sequence, a DNA sequence encoding a bacterial antigen, and a second flanking sequence, further comprising a sequence encoding a chaperonin.

20. Claims 14 and 21 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

21. No claim is allowed.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (571) 272-0801. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

The central fax number for official correspondence is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

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Anne Kubelik, Ph.D.
January 11, 2007

ANNE KUBELIK, PH.D.
PRIMARY EXAMINER